

WHAT IS CLAIMED IS:

1. A quality monitoring system for building structure, comprising:
 - a semiconductor integrated circuit device which is built in the building structure and in which sensors for detecting physical quantity related to the property of the building structure are mounted; and
 - an inspection device that receives a detect signal generated based upon the physical quantity detected by the semiconductor integrated circuit device and determines the quality of the building structure based upon the received detect signal.
2. A quality monitoring system for building structure according to Claim 1, wherein:
 - the semiconductor integrated circuit device is provided with a memory;
 - the memory stores an ID number proper to the semiconductor integrated circuit device; and
 - the semiconductor integrated circuit device transmits the ID number together with the detect signal to the inspection device.
3. A quality monitoring system for building structure according to Claim 1, wherein:
 - the semiconductor integrated circuit device is provided with a memory;
 - the memory stores a detect signal corresponding to the detected physical quantity; and
 - the semiconductor integrated circuit device reads

the detect signal from the memory according to a request from the inspection device and transmits it to the inspection device.

4. A quality monitoring system for building structure according to Claim 1, wherein:

the detect signal is transmitted from the semiconductor integrated circuit device to the inspection device by radio.

5. A quality monitoring system for building structure according to Claim 1, wherein:

the building structure is mainly made of concrete;

the semiconductor integrated circuit device is built in the building structure in a state of paste before the concrete is set; and

the semiconductor integrated circuit device detects the physical quantity of the concrete in the state of paste and transmits the detect signal to the inspection device.

6. A quality monitoring method for building structure, comprising steps of:

a step for detecting physical quantity related to the property of the building structure and building a semiconductor integrated circuit device mounting a sensor for generating a detect signal corresponding to the physical quantity in the building structure;

a step for operating the sensor, detecting the physical quantity related to the property of the

building structure and generating the detect signal corresponding to the physical quantity;

5 a step for transmitting the detect signal to an inspection device provided outside the semiconductor integrated circuit device; and

a step for determining the quality of the building structure based upon the detect signal received by the inspection device.

7. A quality monitoring method for building 10 structure according to Claim 6, wherein:

the semiconductor integrated circuit device further mounts a memory; and

the quality monitoring method for building structure further comprises steps of:

15 a step for storing the detect signal generated by the sensor in the memory; and

a step for reading the detect signal stored in the memory.

8. A quality monitoring method for building 20 structure according to Claim 7, wherein:

the step for reading the detect signal is a step for reading the detect signal stored in the memory according to a request from the inspection device.

9. A quality monitoring method for building 25 structure according to Claim 7, wherein:

the step for transmitting the detect signal to an inspection device provided outside the semiconductor integrated circuit device is a step for transmitting an

ID number proper to the semiconductor integrated circuit device and stored in the memory together with the detect signal; and

the step for determining the quality is a step for specifying a semiconductor integrated circuit device that transmits the detect signal based upon the ID number transmitted from the semiconductor integrated circuit device together with the detect signal and determining the quality of the building structure.

10 10. A quality monitoring method for building structure according to Claim 9, wherein:

the step for specifying a semiconductor integrated circuit device that transmits the detect signal and determining the quality of the building structure is a step detecting the position of the semiconductor integrated circuit device in the building structure and determining the quality of the building structure.

20 11. A quality monitoring method for building structure according to Claim 6, wherein:

the step for transmitting the detect signal to an inspection device provided outside the semiconductor integrated circuit device is a step for transmitting the detect signal from the semiconductor integrated circuit device to the inspection device by radio.

25 12. A quality monitoring method for building structure according to Claim 6, wherein:

the building structure is mainly made of

concrete;

the step for building the semiconductor integrated circuit device in the building structure is a step for building the semiconductor integrated circuit device in the building structure in a state of paste before the concrete is set;

the step for generating the detect signal is a step for operating the sensor in a state of paste before the concrete is set, detecting the physical quantity related to the property of the building structure and generating the detect signal corresponding to the physical quantity; and

the step for transmitting the detect signal to an inspection device provided outside the semiconductor integrated circuit device is a step for transmitting the detect signal to the inspection device after the concrete is set.

13. A quality monitoring method for building structure according to Claim 6, wherein:

the sensor includes at least one of an electric resistance sensor, a temperature sensor, a pressure sensor and an acceleration sensor.

14. A semiconductor integrated circuit device, comprising:

25 a sensor that detects physical quantity measurable by a semiconductor and related to the property of building structure;

an A/D converter that amplifies a signal detected

by the sensor and converts the signal to a digital signal;

a microprocessor that processes the digital signal;

5 a transmitter circuit that transmits a signal processed by the microprocessor to an external device;

an electric power generator configured so that it supplies electric power to at least one of the sensor, the A/D converter, the microprocessor and the

10 transmitter circuit;

an electric power controller that controls whether electric power generated by the electric power generator is supplied to at least one of the sensor, the A/D converter, the microprocessor and the

15 transmitter circuit or not; and

a capacitor configured so that electric power generated by the electric power generator is stored.

15. A semiconductor integrated circuit device according to Claim 14, further comprising:

20 a memory for storing information acquired by the sensor.

16. A semiconductor integrated circuit device according to Claim 15, wherein:

25 the memory stores an ID number proper to a semiconductor integrated circuit device mounting the memory.

17. A semiconductor integrated circuit device according to Claim 14, wherein:

the sensor includes a pressure sensor.

18. A semiconductor integrated circuit device according to Claim 14, wherein:

the transmitter circuit transmits using a pulse train in an ultra wide band (UWB) telecommunication system.

19. A semiconductor integrated circuit device according to Claim 14, wherein:

the electric power generator comprises:
a variable capacitor formed in an MEMS process;

and

an electric power scavenging circuit that scavenges the increase of the electrostatic energy of the variable capacitor by the vibration of the building structure and converts it to electrical energy.

20. A semiconductor integrated circuit device according to Claim 14, wherein:

the sensor, the A/D converter, the microprocessor, the transmitter circuit and the electric power controller are formed on one semiconductor substrate.

21. A semiconductor integrated circuit device according to Claim 14, wherein:

the electric power generator is formed on a second semiconductor chip separate from a first semiconductor chip where the sensor, the A/D converter, the microprocessor, the transmitter circuit and the electric power controller are formed; and

the first semiconductor chip and the second

semiconductor chip are mounted on reverse surfaces of a common substrate.

22. Building structure the quality of which can be determined by a quality monitoring system for 5 building structure, wherein:

the quality monitoring system for building structure comprises:

a semiconductor integrated circuit device which is built in the building structure and in which a 10 sensor for detecting physical quantity related to the property of the building structure is mounted; and

an inspection device that receives a detect signal generated based upon physical quantity detected in the semiconductor integrated circuit device and 15 determines the quality of the building structure based upon the received detect signal; and

the semiconductor integrated circuit device comprises:

a sensor for detecting physical quantity 20 measurable by a semiconductor and related to the property of building structure;

an A/D converter that amplifies a signal detected by the sensor and converts it to a digital signal;

a microprocessor that processes the digital 25 signal;

a transmitter circuit that transmits the signal processed by the microprocessor to an external device;

an electric power generator configured so that it

supplies electric power to at least one of the sensor, the A/D converter, the microprocessor and the transmitter circuit;

an electric power controller configured so that it controls whether electric power generated by the electric power generator is supplied to at least one of the sensor, the A/D converter, the microprocessor and the transmitter circuit or not; and

10 a capacitor configured so that it stores electric power generated by the electric power generator.

23. Building structure in which a semiconductor integrated circuit device is buried and the quality of which can be determined by a quality monitoring method for building structure, wherein:

15 the quality monitoring method for building structure comprises steps of:

a step for building a semiconductor integrated circuit device mounting a sensor for detecting physical quantity related to the property of the building structure and generating a detect signal corresponding to the physical quantity in the building structure;

20 a step for operating the sensor, detecting the physical quantity related to the property of the building structure and generating the detect signal corresponding to the physical quantity;

25 a step for transmitting the detect signal to an inspection device provided outside the semiconductor integrated circuit device; and

a step for determining the quality of the building structure based upon the detect signal received by the inspection device; and

5 the semiconductor integrated circuit device comprises:

a sensor for detecting physical quantity measurable by a semiconductor and related to the property of building structure;

10 an A/D converter that amplifies a signal detected by the sensor and converts it to a digital signal;

a microprocessor that processes the digital signal;

a transmitter circuit that transmits the signal processed by the microprocessor to an external device;

15 an electric power generator configured so that it supplies electric power to at least one of the sensor, the A/D converter, the microprocessor and the transmitter circuit;

20 an electric power controller configured so that it controls whether electric power generated by the electric power generator is supplied to at least one of the sensor, the A/D converter, the microprocessor and the transmitter circuit or not; and

25 a capacitor configured so that it stores electric power generated by the electric power generator.

24. Building structure, wherein:

a semiconductor integrated circuit device provided with a sensor for detecting physical quantity

related to the property of the building structure is buried; and

the quality can be determined based upon a detect signal corresponding to the physical quantity detected by the semiconductor integrated circuit device by the inspection device.

25. Building structure according to Claim 24, wherein:

the semiconductor integrated circuit device further comprises:

an A/D converter that amplifies a signal detected by the sensor and converts it to a digital signal;

a microprocessor that processes the digital signal;

15 a transmitter circuit that transmits the signal processed by the microprocessor to an external device;

an electric power generator configured so that it supplies electric power to at least one of the sensor, the A/D converter, the microprocessor and the transmitter circuit;

20 an electric power controller configured so that it controls whether electric power generated by the electric power generator is supplied to at least one of the sensor, the A/D converter, the microprocessor and the transmitter circuit or not; and

25 a capacitor configured so that it stores electric power generated by the electric power generator.